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Creative Input: The Role of Culture Occupations in the Economy During the 1990s

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Michael Schimpf
Statistics Canada

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Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued cooperation and goodwill.

Acronyms

CA	Census Agglomeration
CMA	Census metropolitan area
NAICS	North American Industrial Classification System
SIC	Standard Industrial Classification

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Abstract

This study analyzes the extent to which culture workers were employed outside of culture industries during the 1990s, for example in manufacturing industries or business services. We find that a significant number of culture workers are involved in producing non-culture goods and services. However, outside of the culture sector, culture employment is concentrated in a limited number of industries. The analysis also shows that growth in the employment of culture workers during the decade was not widespread across the economy since it occurred only in certain industries. Finally, this paper examines the ways in which culture employment patterns vary across the urban-rural spectrum.

1. Introduction

It has long been acknowledged that an educated, highly skilled labour force is essential for economic growth and development. In the economic literature, the stock of skills, knowledge and abilities which are present in the labour force is generally referred to as "human capital", and the role of human capital in the economy has been extensively analyzed. For example, human capital levels, measured by such indicators as educational attainment, are often found to be significant for explaining economic performance across countries.[1] However, the way that we define human capital is open to debate.

Past analytical literature tends to stress the importance of technical skills and forms of knowledge related to science and engineering for economic innovation and growth. Indeed, the importance of scientific and technical skills for producing a wide range of goods and services is often treated as axiomatic. Yet, it is arguable that producing many consumer and industrial products relies on a broad spectrum of skills, knowledge and abilities. Indeed, "softer" skills, particularly those more closely associated with the creative or fine arts, may also play a vital role. For example, the stylistic design of a particular product, such as a household appliance, can decisively affect its appeal to consumers. This suggests that design can add significant value to a consumer good independent of technology. Moreover, given the vast number of consumer products available in the current economic context, it is important for manufacturers to differentiate their products from competitors in order to compete effectively for sales. An excellent example is the automobile industry. Product differentiation in the automobile industry encompasses much more than incorporating technical differences between different kinds of automobiles; clearly, as with household appliances, the stylistic design of a particular vehicle make is essential for appealing to individual consumer tastes. Dedicated marketing strategies are also essential for emphasizing the unique features of a particular automobile and for creating and expanding markets for them. In a similar way, manufacturers of even cutting-edge high-technology consumer products, such as computers, MP3 players and cellular telephones, still require effective marketing campaigns to generate sales, and the products themselves generally embody a significant degree of stylistic design. Hence, even highly technical industries require softer skills as part of the innovation process, alongside engineering and scientific expertise. Indeed, moving up the value-added chain may imply incorporating more art and design into products.

Of course, this perspective is not new. Jane Jacobs' *The Economy of Cities* (1969), a work of seminal importance, emphasized that a wide variety of skills and knowledge are necessary for innovation. More recently, Richard Florida has also recognized the economic importance of a broad set of skills and knowledge. In particular, Florida emphasizes the role that creativity plays in the economy and argues that a "creative class" has come into existence over the past few decades. Florida's creative class includes a wide range of professions and occupations, all of

which can be distinguished by their requirement for creative thinking. In his creative class, he certainly includes scientists, engineers and related technical workers. However, Florida also notes the contributions made by artists, writers and those in similar occupations.[2] Thus, there is support for the notion that creativity more closely associated with artistic occupations is important.

Hence, we are interested in whether forms of creativity outside of purely technical and scientific fields are being used to produce goods and services. In particular, we focus on the role that culture workers play in the economy. Culture occupations are explicitly creative and possess substantial skills and knowledge. Moreover, they embody forms of creativity that are profoundly different from the creativity found in technical and scientific occupations. Many culture workers are obviously employed in the production of cultural goods and services, such as artistic works, concerts and literature. Thus, this paper extends knowledge by asking to what extent employers in non-culture industries, such as manufacturing or business services, rely on culture workers and their skills as inputs into productive processes.

A related question concerns whether the employment of culture workers outside culture industries increased during the 1990s. This decade was a time of immense change in the Canadian economy given the rise of information and communication technologies (such as the internet), the coming into force of the North American Free Trade Agreement and the economic impact of global competition. Moreover, as a result of these changes, knowledge and creativity have steadily assumed more important roles, to the extent that the current economy is often referred to as the "new economy" in the media and analytical literature.[3] Hence, we hypothesize that the evolution of the economy during the 1990s led to greater demand for culture workers.

Finally, this paper studies whether the way in which culture workers in non-culture industries are employed varies across the urban-rural spectrum. Florida (2005) and other recent research tend to emphasize the role cities play in national economic life.[4] In part, this role derives from the large labour markets that cities, by their very nature, are host to. These large labour markets allow firms easier access to skilled workers, especially those with specific skills and knowledge. Thus, we expect that firms that employ culture workers more intensively would have an incentive to locate in cities, and we test this hypothesis by analyzing patterns of culture employment across the urban-rural spectrum.

2. Methodology

The analysis in this paper is based on employment data from the 1991, 1996 and 2001 Censuses of Population. This paper focuses on the 1990s for two reasons. First, the 1990s were a time of significant change in the Canadian economy. The growing importance of information and communication technologies such as the internet, the effect of the North American Free Trade Agreement and the rise of global competition are just three examples of important economic developments during this decade. Hence, the 1990s are of particular interest for assessing the role which culture-based occupations play in the economy. Second, and from a more practical standpoint, data limitations resulting largely from changes to the occupational coding system preclude the inclusion of data from prior to the 1991 Census of Population in this study. Also, at the time of this writing, employment data from the 2006 Census were not yet available.

This study relies on the *Canadian Framework for Culture Statistics* to determine which occupations are cultural in nature. The *Framework* defines culture occupations to be those which involve "creative artistic activity and the goods and services produced by it, and the preservation of human heritage." Examples of culture occupations in the *Framework* include artists, writers and museum curators. Other types of occupations that are not directly related to the production of culture goods and services but provide technical, managerial or manufacturing support are also included in the *Framework*. Examples of these are performing arts managers, library clerks and audiovisual technicians. The complete list of 48 culture occupations is presented in Table 1 and is taken from the *Framework*. Of these, 21 directly involve creative and artistic production or heritage collection and preservation (core culture occupations) while the other 27 are culture support occupations. This study restricts itself to examining the role that core creative culture occupations play in the economy and excludes culture support occupations. The core creative culture occupations in the *Framework* are more directly related to the forms of creativity emphasized recently by Richard Florida. As can be seen in Table 1, the core creative culture occupations can be divided into four main occupational groups. These are the literary arts, the visual arts and design, performing arts and heritage occupations. Although this study focuses on employment trends for just the core creative occupations, for ease of exposition, from this point onwards, the term "culture workers" is used instead of core culture workers to refer to those employed in core creative occupations.

In the Census, employed workers are classified according to occupation (using the Standard Occupational Classification) and also according to the industry to which their employer belongs. The Standard Industrial Classification - Establishments (SIC-E) was used to define industries for the 1991 and 1996 Censuses. For the 2001 Census, both the SIC-E and the new North American Industrial Classification System (NAICS) were used to classify workers by industry. A figure illustrating the structure of both classification systems is presented in Appendix 1 and can be used as a reference for those readers not familiar with them.

The SIC-E was selected for this study since it was used to code workers for all three Censuses. Hence, selecting the SIC-E avoided issues arising from back casting data, which would have been unavoidable if NAICS had been used instead. Because the Census double-codes workers by both occupation and by industry, it is possible to determine the occupations found in any industry and also the number of workers employed in each occupation that comprises an industry. For example, for the Motion Picture and Video Industry, it is possible to estimate the number of actors, broadcast technicians, managers and workers in other occupations that are employed in the industry. Hence, by taking advantage of the double-coding of workers by both occupation and industry, census data can be used to calculate the extent to which culture workers are used as labour inputs for a wide variety of economic activities.

The SIC-E divides the economy into 18 Divisions; examples include, Manufacturing and Business Services. Divisions therefore represent a very high level of aggregation in the SIC-E. Each Division is further subdivided into major groups of industries, the second level of aggregation. In SIC-E, there are a total of 76 major groups. These in turn are divided into industry groups. Hence, an industry group is the third level of aggregation in the SIC-E. As well as defining which occupations are cultural in nature, the *Framework* also specifies which industries are cultural. Based on the *Framework*, a total of 20 industry groups are considered to be cultural in nature and these are listed in Table 2. Many are embedded within major groups that are, on the whole, non-cultural. For example, the communications industry (a major group) includes both broadcasting and postal and courier services. The former is a culture industry group while the latter is not. Since this study focuses on culture employment in non-culture areas of the economy, the 20 cultural industry groups were separated from the higher aggregation major group level. Considered together, the 20 cultural industry groups form the culture sector of the economy in this study. The workers remaining in the major groups, after the removal of the culture industries, therefore compose the non-culture portion of the economy.[5] The number of culture workers and the size of the total workforce for each Division were calculated, allowing the proportion of culture workers (out of the total number of workers) to be determined.[6] The proportion of culture workers in each Division in turn indicates the extent to which culture workers are used as labour inputs to produce goods and services in that Division.

Since the 2001 Census of Population was coded using both industrial classification systems, it was possible to investigate the extent to which the choice of SIC-E led to different results in 2001 compared to the case if NAICS had been used for that year. It was found that one major group and one industry group in the SIC-E contained a large number of culture workers who would have been classified as working in culture industries had NAICS been used, even though they are non-culture industries in SIC-E.[7] Hence, whether they should be included in the culture sector or the non-culture sector is ambiguous. Therefore, for the purposes of this study, both are considered to be separate from the culture sector and the non-culture sector and are referred to as "unallocated industries." Hence, using SIC-E, the Canadian economy was divided into three broad sectors: the non-culture sector composed of 74 major groups (with culture industry groups removed), the culture sector, and unallocated industries. In this paper, overall patterns of culture worker employment in the non-culture sector are examined along with employment patterns in specific Divisions.

Table 1

Culture occupations

Core creative and artistic production culture occupations	Culture support occupations
Literary arts:	Cultural management:
Authors and Writers	Library, archive, museum and art gallery managers
Editors	Managers in publishing, motion pictures, broadcasting and performing arts
Journalists	Supervisors, library, correspondence and related information clerks
Visual arts and design:	
Architects	Technical and operational occupations:
Landscape architects	Library clerks
Industrial designers	Correspondence, publication and related clerks
Painters, sculptors, and other visual artists	Landscape and horticultural technicians and specialists
Photographers	Architectural technologists and technicians
Graphic designers and illustrators	Drafting technologists and interpreters
Interior designers	Professional occupations in public relations and communications
Theatre, fashion, exhibit and other creative designers	Translators, terminologists and interpreters
Artisans and craftsperson's	Library and archive technicians and assistants
	Technical occupations related to museums and galleries
Performing arts:	Film and video camera operator
Actors and comedians	Graphics arts technicians
Producers, directors and choreographers	Broadcast technicians
Conductors, composers and arrangers	Audio and video recording technicians
Musicians and singers	Other technical occupations in motion pictures, broadcasting, and the performing arts
Dancers	Support and assisting occupations in motions pictures, broadcasting and the performing arts
Other performers	Announcers and other broadcasters
Heritage collection and preservation culture occupations	Patternmakers, textile, leather and fur products
Heritage occupations:	Manufacturing occupations:
Librarians	Typesetters and related occupations
Conservators and curators	Supervisors, printing and related occupations
Archivists	Printing press operators
	Printing machine operators
	Camera, platemaking and other pre-press occupations
	Binding and finishing machine operators
	Photographic and film processors

Source: Canadian Framework for Culture Statistics

Table 2

List of SIC-E Industry Groups defined to be in the Culture Sector for this study

SIC-E Code	SIC-E Industry Group Name
281	Commercial Printing Industries
282	Platemaking, Typesetting and Bindery Industry
283	Publishing Industries
284	Combined Publishing and Printing Industries
351	Clay Products Industries
481	Telecommunication Broadcasting Industries
651	Book and Stationery Stores
655	Musical Instrument and Record Stores
774	Advertising Services
854	Library Services
855	Museums and Archives
869	Health and Social Service Associations and Agencies
961	Motion Picture, Audio and Video Production and Distribution
962	Motion Picture Exhibition
963	Theatrical and Other Staged Entertainment Services
982	Business Associations
983	Professional Membership Associations
984	Labour Organizations
985	Political Organizations
993	Photographers

Source: This list is from an empirical concordance that was developed between SIC-E and NAICS for this study. It is based on the definition of culture industries presented in the *Canadian Framework for Culture Statistics*. The *Framework* specifies culture industries in NAICS only.

3. National patterns in culture worker employment

This section explores how culture workers are distributed across the overall Canadian economy. We initially divided the economy into three sectors: the culture sector, the non-culture sector and the unallocated industries sector. Of particular interest is the use of culture labour inputs to produce goods and services in the non-culture sector.

A not unreasonable view would suggest that the majority of culture workers would be employed in culture industries. Yet, as Table 3 reveals, just under half of all culture workers are employed in the non-culture sector of the economy. Hence, demand for culture workers outside of the culture sector itself is very important for understanding patterns in culture worker employment. Table 4 presents the shares of culture workers relative to total employment for the culture sector, the non-culture sector and the unallocated industries sector of the economy. Culture workers represented over 0.7% of the total workforce in the non-culture sector during the 1990s.

Table 3
Distribution of culture workers

	Culture workers		
	1991	1996	2001
	number		
Non-culture sector	88,295	89,950	104,445
Culture sector	70,325	93,325	112,015
Unallocated industries sector	30,115	36,500	43,215
Totals	188,735	219,775	259,675

Table 4
Shares of culture workers out of total workers for each sector

	Share		
	1991	1996	2001
	percentage		
Non-culture sector	0.73	0.73	0.77
Culture sector	15.29	17.4	19.53
Unallocated industries sector	7.25	7.48	7.37
Entire economy	1.45	1.65	1.77

A second finding is the significant growth in overall culture employment during the 1990s. As Table 3 reveals, at the national level, total employment in culture occupations rose from 188,735 to 259,675, an increase of 70,940 jobs. This is a growth rate of 37.6%, three times faster than the 13.0% growth in the size of the total workforce over the decade.[8] Hence, culture occupations, and the creativity embodied in them, became more important in the overall economy during this decade.

Both tables also indicate that most of the growth in employment in culture occupations during the 1990s occurred in the culture sector itself. Culture employment in the culture sector increased by 41,690, much more than the increase of 16,150 in the non-culture sector; culture workers composed 15.29% of all workers in the culture sector in 1991 but 19.53% in 2001. The share of culture workers in the non-culture sector increased slightly from 0.73% to 0.77% during the 1990s, indicating that growth in culture jobs in this portion of the economy kept pace with growth in total employment. Therefore, over the course of the decade, the non-culture sector did not increase its reliance on culture labour inputs to any great extent. However, this still leaves open the question concerning whether specific Divisions within the non-culture sector increased their employment of culture workers.

Trends in Divisions

The non-culture sector of the economy contains a wide variety of industries. Hence, the way that culture workers are used by employers in the non-culture sector could vary significantly across the industry spectrum. To determine whether this is the case, the non-culture sector was broken into its component Divisions to examine culture employment at the next lower level of aggregation. Table 5 presents the non-culture sector of the economy at this more detailed level to better understand where culture employment is located and how culture employment patterns developed through the 1990s. Agriculture, Fishing and Trapping and Logging and Forestry were considered together because each employs only a very small number of culture workers.

The data indicate that culture workers in the non-culture sector are not distributed evenly across Divisions. Rather, Business Services, Educational Services, Manufacturing and Retail Trade are where the majority of culture workers in the non-culture sector are employed. In 1991, these four divisions accounted for 65.2% of total culture worker employment in the non-culture sector, a proportion that rose to 70.1% in 1996 and 73.7% in 2001. Hence, the analysis here focuses on these four Divisions.

Table 5

Culture worker employment and employment shares by non-culture Division

Division	Culture workers			Culture employment share in each Division		
	1991	1996	2001	1991	1996	2001
	number			percentage		
Business Service Industries	13,255	15,720	25,340	2.44	2.42	2.79
Educational Service Industries	17,565	21,840	22,490	1.96	2.35	2.26
Manufacturing Industries	12,240	14,520	19,030	0.72	0.85	1.00
Retail Trade Industries	14,490	10,995	10,105	0.88	0.68	0.59
Other Service Industries	6,310	7,570	7,665	1.31	1.38	1.42
Government Service Industries	9,275	7,450	5,920	0.89	0.89	0.70
Wholesale Trade Industries	2,225	2,865	3,860	0.39	0.43	0.49
Construction Industries	2,980	1,790	2,655	0.38	0.26	0.32
Health and Social Service Industries	2,560	1,570	1,870	0.21	0.12	0.12
Accommodation, Food and Beverage Services	2,070	1,860	1,630	0.26	0.21	0.17
Finance and Insurance Industries	1,525	1,150	1,345	0.28	0.23	0.24
Communication and Other Utility Industries	1,550	1,110	870	0.39	0.29	0.22
Transportation and Storage Industries	895	560	560	0.17	0.10	0.09
Real Estate operator and Insurance Agent Industries	410	370	455	0.19	0.14	0.17
Agriculture; Fishing and Trapping; Logging and Forestry	575	405	380	0.09	0.07	0.07
Mining, Quarrying and Oil Well industries	370	175	270	0.21	0.11	0.17
Totals	88,295	89,950	104,445	...	...	...

... not applicable

Manufacturing and Business Services

Increases in culture worker employment during the 1990s were particularly noteworthy in Manufacturing and Business Services. Manufacturing added about 6,790 culture jobs to an existing base of 12,240 culture workers during the decade, resulting in a clear and steady rise in the share of culture workers in this Division from 0.72% to 1.00% over the decade. This may not appear to be significant, yet the actual number of culture workers in Manufacturing increased by over 55%, a rate far greater than the increase in overall manufacturing employment (13%).

Appendix 2 breaks out the four main groups of culture occupations (literary arts, visual arts and design, performing arts and heritage occupations) for each Division. For Manufacturing, Appendix 2 indicates that visual arts and design occupations made up the vast majority of culture employment in this Division. Hence, it is not surprising that strong growth in this occupational group, from 10,455 workers in 1991 to 17,405 workers in 2001, was the source of the overall gain in culture employment observed over the decade. The large increase in visual arts and design jobs strongly suggests that the production of manufactured goods in Canada involved a greater degree of design and artistic work towards the end of the 1990s compared to earlier years. This pattern is consistent with the hypothesis that culture workers became more important for the production of goods and services in the economy during the 1990s.

Business Services is another Division which employs large numbers of culture workers. Like Manufacturing, the number of culture workers employed in the Division almost doubled during the 1990s, from 13,255 workers to 25,340 workers. However, total employment in Business Services also increased strongly, from 542,595 to 906,845. Hence, the share of culture workers in the Division increased from 2.44% in 1991 to just 2.70% in 2001, despite the dramatic rise in the number of culture workers employed in the Division.

Data presented in Appendix 2 reveal that the vast majority of culture workers in Business Services are in visual arts and design occupations. During the 1990s, the number of workers in this occupational group rose from 10,840 to 19,900. Therefore, as with Manufacturing, strong growth in employment in visual arts and design occupations was largely responsible for the overall rise in the share of culture workers in this Division. Also noteworthy is the tripling of employment of those employed in literary occupations, including authors, writers, editors and journalists, from 1,220 in 1991 to 3,960 workers in 2001. It is interesting that the increase in the share of culture workers in Business Services after 1996 coincided with the rise of information and communication technologies to prominence in the economy. This could have led to greater demand for visual arts and design workers within Business Services, for example in web design, along with greater demand for writers and editors as well.

Educational Services and Retail Trade

Education Services, another Division with a large number of culture workers, saw an increase in culture employment over the 1991-1996 period from 17,565 to 21,840, causing the share of culture workers to rise from 1.96% to 2.35%. However, during the latter half of the 1990s, culture employment grew less strongly, increasing by just 650 workers to 22,490. This resulted in a subsequent decline in the share to 2.26% since total employment growth in Educational Services was far larger. Nonetheless, the share at the end of the decade was still higher than at the beginning of the 1990s. The increase during the first half of the decade can largely be attributed to a sharp rise in the employment of performing arts workers (from 10,265 to 15,860). This increase is not intuitive and difficult to interpret and may be due to changes in the way in which workers were coded between the 1991 Census and the 1996 Census. Hence, we attach less importance to this increase than the patterns in culture employment observed for Manufacturing and Business Services.

The Retail Trade Division also employs significant numbers of culture workers, the vast majority of which are in visual arts and design occupations. This is intuitive since a number of visual arts and design workers, such as fashion designers, illustrators, crafts persons and artisans of various kinds could potentially be employed in a variety of retail outlets and stores. However, unlike Business Services and Manufacturing, the actual number of culture workers in Retail Trade decreased over the course of the 1990s, from 14,490 to 10,105. As can be seen in Table 5, this led to a sharp drop in the share. A potential explanation for the decline could be that design work in the Retail Trade was increasingly being outsourced during the 1990s. In any case, Retail Trade differs from Manufacturing, Educational Services and Business Services since it lost a large portion of its culture workforce.

Discussion

Patterns in the employment of culture workers suggest that culture-based creativity, skills and knowledge are particularly relevant for Manufacturing, Business Services and Educational Services. In contrast, the culture employment shares for Retail Trade and also those for most other Divisions declined during the 1990s, as indicated in Table 5. Hence, the data suggest that a degree of caution is justified when assessing the importance of culture-based creativity for producing goods and services, at least for significant portions of the non-culture economy. In addition, it appears that the immense changes which occurred in the Canadian economy in the 1990s did not lead to a general increase in the use of culture-based creativity as inputs into productive processes. Rather, culture employment growth outside of culture industries was limited in scope.

It is important to note that these conclusions apply only to the direct employment of culture workers as labour inputs; that is, the case where a firm or public sector agency has culture workers on staff. Another possibility exists. As Tables 3 and 4 demonstrate, culture employment in the culture sector did increase dramatically during the 1990s. The growth of culture jobs in the culture sector in fact outstripped growth in total employment by a wide margin, leading to a rise in the share of culture workers by over four percentage points in just ten years. This could speak to a growing emphasis on direct creative production and a healthy vitality within the culture sector itself. However, it is also plausible that the non-culture sector of the economy increased its reliance on commodities produced in the culture sector during the 1990s. Put another way, demand and supply linkages between firms in both sectors could have strengthened during the decade. For example, rather than hiring graphic designers directly, an engineering or construction firm might contract with a graphics design firm (in NAICS 5414, a culture industry) to assist with marketing. Directly employing graphic designers would result in the engineering/construction firm using a culture labour input to produce non-culture products, and such workers would be coded as culture workers in a non-culture industry by the Census. But, if the engineering/construction firm were to outsource work to a graphic design firm, the employees in the design firm would still be culture workers in a culture industry, even though their firm produces output for the engineering/construction firm (amongst a potentially diverse array of clients).

Therefore, even if most Divisions in the non-culture economy did not use culture labour inputs extensively or increase their direct employment of culture workers, it is still possible that employers increasingly relied on culture labour inputs during the 1990s, albeit indirectly through outsourcing to the culture sector. This indirect method of employing culture labour inputs by the non-culture economy could be investigated further by an input-output analysis within a general economic equilibrium framework. This possibility was investigated. However, the commodity classification system is too coarse to identify effectively a concrete set of culture inputs that would be consistent with the *Canadian Framework for Culture Statistics*. Hence, investigation of whether the non-culture sector of the economy outsourced work to firms in the culture sector remains open as a possibility for future research work.

4. The geographic dimension

This section examines whether patterns of employment for culture workers differ across the urban-rural spectrum. We hypothesize that culture workers are more likely to be employed by non-culture industries in large urban areas compared to rural settings. This expectation is rooted in the fact that many culture occupations are highly specialized. For example, architects and other design professionals often require years of post-secondary training. In general, it is easier for workers with very specialized skill-sets and knowledge to find employment in cities, where a large variety of employers are located. Thus, both culture workers and their employers benefit from being in urban areas, and especially larger urban centres. Hence, this section extends the national analysis by investigating how culture employment patterns in urban areas differ from rural regions.

To do this, we divided Canada into three regional groups: large cities (Census Metropolitan Areas), which have a population greater than 100,000; small cities (Census Agglomerations), which have a population greater than 10,000 but typically less than 100,000; and rural areas. Culture employment patterns in each of these regional groups were examined and compared. Table 6 reveals that culture workers are employed to the greatest extent in large cities, less in small cities and least in rural areas, as expected. The difference in the share of culture workers is particularly pronounced between large cities and smaller cities. Moreover, the share of culture workers out of the total workforce in large cities increased during the 1990s and particularly after 1996, a trend not seen for the other two geographic classes. This suggests that the creative knowledge and skills that culture workers possess are more applicable within large urban economies.

Table 6

Culture employment in the non-culture sector

	Culture workers in non-culture sector			Share of total workforce in non-culture sector		
	1991	1996	2001	1991	1996	2001
	number			percentage		
CMA	68,075	69,485	83,440	0.87	0.88	0.94
CA	9,320	10,210	10,090	0.51	0.54	0.50
Rural	10,900	10,255	10,915	0.44	0.41	0.41

There are two broad explanations for why large cities might have higher shares of culture workers compared to CAs and rural areas. The first is that CMAs, CAs and rural areas in general are very different in terms of the industries located in them. Large cities tend to have far more diversified economies while the economies of rural areas and small cities are more specialized.[9] Thus the particular mix of industries present in large urban areas compared to smaller centres is potentially an important determinant of culture employment levels, especially in light of evidence in the previous section that culture workers are employed in great numbers in only certain Divisions. This effect is referred to as an "industry mix effect".

A second potential explanation is that firms and public agencies that are located in large cities might tend to hire more culture workers compared to similar employers in smaller cities and rural areas. This reflects the possibility that methods of producing goods and services, or the "production functions" for firms and public agencies, differ across the urban-rural spectrum, even within the same industry. Put another way, employment practices with regard to culture workers may differ between city and country. This second explanation is referred to as a "region effect" since it considers the influence of the region itself on employer behavior.

To determine the relative importance of the industry mix effect and the region effect, culture employment shares for CMAs, CAs and rural areas were decomposed for 1991 and 2001. The decomposition takes the following mathematical form:

$$s_{\bullet j} - s_{\bullet\bullet} = \sum_i I_{ij}(s_{i\bullet} - s_{\bullet\bullet}) + \sum_i I_{ij}(s_{ij} - s_{i\bullet}).$$

The "s" terms are culture employment shares. The "I_{ij}" term is a weight that measures the proportion of employment in a particular major group in a region (CMA, CA or rural) out of total employment in that region. The "i" term indexes each of the 74 non-culture major groups, and the "j" term indexes the particular region. The dot ($\bullet$) indicates that the variable has been aggregated over that dimension. If the dot replaces "j", it means the variable has been aggregated across all regions and if it replaces an "i", all major groups are being aggregated. Hence, $s_{\bullet j}$ refers to the aggregate culture employment share across all major groups in region j.

The left-hand side of the equation measures the extent that the share of culture workers in the non-culture sector in region j deviates from the national average. The first term on the right hand side is the industry mix effect, and it will be positive if a particular region contains a mix of major groups in which culture workers happen to be employed to a greater extent than the particular mix of major groups across the entire national economy. The second term measures the region effect. It will be positive if employers utilize culture workers to a greater extent when they are located in a particular region relative to the national pattern. Table 7 presents the results of the decomposition.

The industry mix effect and the region effect are positive for CMAs but both are negative for CAs and rural areas in 1991 and 2001.[10] Hence, both effects contribute to the relatively lower numbers of culture workers seen in the non-culture sectors of small cities and rural areas. For CAs, the region effect is much greater than the industry mix effect, indicating that it is more important. Hence, the production functions for firms and public agencies differ between large and small cities concerning the use of culture occupations. In contrast, for rural areas, the region

effect and the industry mix effect are roughly equal in importance; both effects are similar in magnitude in 1991 and 2001.

Table 7

Industry mix and region effects for culture employment shares in the non-culture sector

	Panel A: 1991		
	Deviation from national level	Mix effect	Region effect
	number	percentage	
CMA	0.140	0.057	0.084
CA	-0.218	-0.048	-0.170
Rural	-0.285	-0.145	-0.140
	Panel B: 2001		
	Deviation from national level	Mix effect	Region effect
	number	percentage	
CMA	0.167	0.070	0.097
CA	-0.267	-0.086	-0.182
Rural	-0.359	-0.172	-0.188

The results obtained for the region effect in the decomposition demonstrate that non-culture employers within the same major groups are more likely to rely on the skill-sets embodied in culture occupations when located in large cities rather than smaller regions. As hypothesized above, this result may reflect the greater availability of culture workers, many of which have highly specialized skills and knowledge, in large cities. Hence, the region effect is consistent with the notion that culture workers, along with the firms that employ them, benefit from being in large cities. Employers in rural settings and small cities, in contrast, would possibly have little choice but to outsource culture-related work (design work for example) to firms in cities due to the small culture workforce located outside of CMAs. This possibility could be investigated in future research.

The industry mix effect shows that the industrial structure in large urban settings is weighted towards those major groups that employ relatively larger numbers of culture workers compared to rural areas and small cities. This result would partially reflect the fact that high-end design work often occurs in cities and especially large cities. For example, it is advantageous for architectural firms, design firms and marketing firms to locate in large cities, close to a large number of potential clients. Also, manufacturing industries employ a significant number of culture workers, primarily in visual arts and design occupations. Since manufacturing plants tend to cluster in large cities, this would contribute to higher shares in CMAs relative to the other two geography classes. Finally, natural resource industries, which employ few culture workers, tend to be more prominent in rural and small urban economies. Thus, the positive industry mix effect seen for large cities and the negative effect for small cities and rural areas is intuitive. Also, the fact that the negative industry mix effect strengthens from small cities to rural areas further suggests that size matters; that is, the smaller an area's population, the less likely it will have an industry structure that supports large concentrations of culture workers.

5. Conclusions

The evidence suggests that culture workers and their knowledge, skills and creativity are of some relevance for producing non-culture goods and services. Indeed, a significant proportion of all culture workers are employed in non-culture contexts, particularly in Manufacturing, Business Services, Educational Services and Retail Trade. Yet, the employment of culture workers also faces certain limitations. The first limitation stems from the fact that most Divisions in the non-culture sector do not employ many culture workers. Moreover, clear and sustained growth in culture worker shares over the 1990s occurred principally in Manufacturing and Business Services; most Divisions in the non-culture sector did not see any significant expansion in culture employment over the decade. This sounds a cautionary note: the immense changes occurring in the Canadian economy during the 1990s do not seem to have unleashed widespread growth in the importance of culture labour inputs for productive processes across the non-culture sector of the economy.

Another limitation is occupational in nature. The majority of culture employment is in visual arts and design occupations, and the bulk of the growth in culture employment during the 1990s occurred in these occupations as well. Hence, the forms of creativity, knowledge and skills found in visual arts and design appear to be particularly relevant for non-culture production. In contrast, increases in employment for the performing arts, the literary arts and heritage occupations were less substantial.

A final limitation is geographical in nature. Firms and other employers seem to rely to a greater extent on culture workers when located in large urban settings. In addition, compared to small cities and rural areas, the mix of industries (major groups) found in large cities appears to be more oriented towards those which employ culture workers in large numbers. Thus, culture employment is particularly rooted in large urban settings.

On balance, it seems that outside of Manufacturing and Business Services, outside of large cities and outside of visual arts and design, the importance of culture-based skills, knowledge and creativity for production is less clear. That said, one potential avenue for future investigation would be to determine whether firms in the non-culture sector outsourced work to the culture sector of the economy to any great extent during the 1990s. If so, then it is possible that the employment of culture workers to produce non-culture goods and services grew more significantly in that decade than is seen in this study.

Appendix 1

Summary of Structure of NAICS and SIC-E

Standard Industrial Classification – Establishments (SIC-E):

Level of Aggregation	Example of drilling-down with Manufacturing:
1. Entire Economy	
2. 18 Divisions	Manufacturing Industries
3. 76 Major Groups	Food Industries; Beverage Industries; Paper and allied Products Industries; and many others
4. Industry Groups	Meat and Poultry Products; Soft Drink Industry; Pulp and Paper Industries; and many others

North American Industrial Classification System (NAICS):

Level of Aggregation	Example of drilling-down with Manufacturing:
1. Entire Economy	
2. 20 Sectors	Manufacturing
3. 103 Subsectors	Food Manufacturing; Beverage and Tobacco Product Manufacturing; Paper Manufacturing and many others
4. 328 Industry Groups	Meat Product Manufacturing; Beverage Manufacturing; Pulp, Paper and Paperboard Mills; and many others
5. 728 Industries	Animal Slaughtering and Processing; Breweries; Pulp mills

Appendix 2

Breakdown of Culture Employment for 1991, 1996 and 2001

	Heritage occupations	Literary Arts occupations	Performing Arts occupations	Visual arts and design occupations
1991				
Agricultural and Related Service Industries;				
Fishing and Trapping Industries; Logging and Forestry Industries	x	x	x	470
Mining (including Milling), Quarrying and Oil Well Industries	130	x	x	120
Manufacturing Industries	115	1380	290	10,455
Construction Industries	x	x	x	2,865
Transportation and Storage Industries	105	210	125	455
Communication and Other Utility Industries	160	385	190	820
Wholesale Trade Industries	x	255	x	1,835
Retail Trade Industries	90	305	325	13,765
Finance and Insurance Industries	230	605	140	560
Real Estate Operator and Insurance Agent Industries	x	x	x	265
Business Service Industries	465	1,220	735	10,840
Government Service Industries	2,595	2,350	1180	3,150
Educational Service Industries	4,160	1,015	10,265	2,120
Health and Social Service Industries	425	320	510	1,300
Accommodation, Food and Beverage Service Industries	70	120	1,545	345
Other Service Industries	260	350	4,590	1,110
1996				
Agricultural and Related Service Industries;				
Fishing and Trapping Industries; Logging and Forestry Industries	x	x	x	120
Mining (including Milling), Quarrying and Oil Well Industries	x	x	x	85
Manufacturing Industries	155	1,095	200	13,065
Construction Industries	x	x	x	1,760
Transportation and Storage Industries	65	150	90	250
Communication and Other Utility Industries	85	355	135	530
Wholesale Trade Industries	50	260	115	2,435
Retail Trade Industries	105	210	220	10,470
Finance and Insurance Industries	x	450	x	520
Real Estate Operator and Insurance Agent Industries	x	x	x	225
Business Service Industries	585	1,930	695	12,515
Government Service Industries	2,170	1,935	780	2,570
Educational Service Industries	3,205	835	15,860	1,935
Health and Social Service Industries	330	250	305	690
Accommodation, Food and Beverage Service Industries	x	x	1,695	150
Other Service Industries	230	420	5,910	1,010
2001				
Agricultural and Related Service Industries;				
Fishing and Trapping Industries; Logging and Forestry Industries	x	x	x	250
Mining (including Milling), Quarrying and Oil Well Industries	x	x	x	145
Manufacturing Industries	150	1,290	185	17,405
Construction Industries	x	x	x	2,530
Transportation and Storage Industries	x	x	175	235
Communication and Other Utility Industries	x	285	x	415
Wholesale Trade Industries	x	275	x	3,420
Retail Trade Industries	175	290	220	9,420
Finance and Insurance Industries	195	445	55	640
Real Estate Operator and Insurance Agent Industries	x	x	x	315
Business Service Industries	710	3,960	765	19,900
Government Service Industries	1,525	1,650	600	2,135
Educational Service Industries	1,635	850	17,235	2,765
Health and Social Service Industries	370	430	370	710
Accommodation, Food and Beverage Service Industries	x	x	1,375	205
Other Service Industries	230	375	6,040	1,020

x suppressed to meet the confidentiality requirements of the *Statistics Act*

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Endnotes

1. A seminal paper on the effect of human capital on gross domestic product per capita is Mankiw, Romer and Weil (1992).
2. See Florida (2002), pp. 68-9.
3. For a discussion of past research on the new economy, see Gellatly (2003). Also see Beckstead et al (2003).
4. A number of recent studies tend to emphasize the role of cities in the national economy. As well as Florida (2005), see for example, Beckstead and Brown (2006), Partridge, Olfert and Alasia (2007) and Gertler et al (2002).
5. There are 76 major groups in SIC-E (1980). However, Printing, Publishing and Allied Industries is the one major group that is entirely composed of cultural industry groups. Therefore, this major group was entirely removed from the non-culture sector.
6. Several practical limitations affected the actual calculation of culture employment levels in non-culture industries at the major group level. The principal difficulty stems from the fact that the *Framework* specifies culture industries according to NAICS only. However, since this study used the SIC-E rather than NAICS, an empirical concordance between SIC-E and NAICS was necessary to determine which industries in SIC-E were culture industries. Since no concordance is ever perfect, this resulted in deviation from the theoretical definition of the culture sector specified in the *Framework*. A more minor difficulty stems from the fact that the Census coded workers to a higher level of industrial aggregation than the level of aggregation specified in the *Framework*. This means that our culture industries may at times be broader in scope than envisaged by the *Framework*.
7. These are SIC-779 (Other Business Services) and SIC-99 (Other Service Industries).
8. The total size of the Canadian workforce was 13,005,505 in 1991, 13,318,740 in 1996 and 14,695,135 in 2001.
9. See Beckstead and Brown (2003) for a discussion of how the industrial diversity of local economies increases with population size.
10. The pattern is similar for 1996, but this year is not shown for purposes of clarity.

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